# ON FISH POISONING AND POISONS EMPLOYED AMONG THE ABORIGINES OF QUEENSLAND.

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(Plates IV. and V. and One Text-figure.)

The practice of employing vegetable poisons for stupefying or killing fish is by no means confined to the aboriginal inhabitants of North-Eastern Australia, but is in vogue almost universally and dates back to ancient times; the method did not even escape the notice of the wily English poacher.

We find similar methods to those adopted here practised in other parts of Australia, viz., New South Wales, Victoria, Northern Territory, and Western Australia. Central and South Australia are excepted, local conditions being generally unfavourable to their application; whilst the Tasmanians never used fish-poisons at all; they never attempted to catch fish at any time, strange as it may appear, and confined their attention to the taking of shellfish, crays, and mussels. (*Beattie.*)

As far as South and Central Australia are concerned, Professor E. C. Stirling says: "I have no knowledge that fish-poisons are used in these regions. I never heard of the practice during my two visits to the MacDonnell Ranges, where from the localised and restricted conditions of the waters it might be practicable; and I have recently had my own opinion confirmed by the more extended knowledge of an observant friend who spent many years in the MacDonnells. The natives there do, however, poison with pituri the waters where emus drink. In the southern parts of South Australia, where the fish are got from the large lakes and River Murray, the practice would be impossible."

With reference to Western Australia we know very little; such mention of fish-poisons as E. Clement favours us with when he says "fish is caught either with nets or are stupefied by a plant called 'Kurrurru' which is placed into the pools"[1] is of little more scientific value than a record, since probably by this time the identity of the plant is unfortunately lost.

Going further afield, we find that their use was known in Malaysia to a considerable degree, to parts of Polynesia and Melanesia, India, South Africa, South America, and amongst the North American Indians.

Expert navigators and canoe-builders such as the Maoris never used them. Fish are very plentiful all around the coast, and they probably never

[1] "Ethnological Notes on the Western Australian Aboriginals," publications of the Royal Ethnographical Museum at Leyden, series 2, No. 6, reprinted from International Archiv. für Ethnographie, vol. 16, 1903.

experienced any difficulty in obtaining all they required. Mr. Cheeseman, the Curator of the Auckland Museum, has pointed out that it is rather curious, considering the extent to which fish-poisons are employed in Polynesia, but that on the other hand none of the plants used in Polynesia extend to New Zealand, and that they have very few poisonous species of their own. This just suggests the idea that the plentiful growth of poisonous shrubs may be one of the reasons why the Malaysians employed fish-poisons universally, in spite of the fact that they too might be regarded as expert navigators, and might have got all the fish they required by more legitimate means.

Pliny the Elder[2] not only states that fish-poisons were used with success on the Roman Campania, but that lime was used as an adjunct. That the fish were attracted by the plant Pliny emphasises, but what part the lime played in the killing process he does not say.

Lime is used with effect in the Western Pacific, and the late Douglas Rannie spoke from personal experience when he said: "Lime produced from calcined or burnt coral is utilised for many purposes and in a great variety of ways by the natives inhabiting the many islands of the Western Pacific with whom I have come into contact. One practice I have seen reverted to, but one which does not gain favour with the permanent residents of a district, is that of employing lime to catch a big haul of fish. This plan is simply to throw a quantity of lime into a waterhole in some freshwater stream or creek, which has the almost instantaneous effect of killing all the fish in and below the waterhole for some considerable distance down the stream. But as this method kills far more fish than is usually required, it is looked upon as reprehensible and wasteful, and is as a rule only adopted by natives' travelling parties, and strangers poaching on others' properties far off from their own homes. I have seen marauding parties of head-hunters using this means of obtaining fish from freshwater streams on the west coast of Gaudalcanar, Solomon Islands. I have also seen war parties poaching in similar manner in the rivers of Malaita. As these people are betel-nut eaters they always carry a plentiful supply of lime. I have never seen them killing with lime in the salt water, so cannot say if it would be as effective in salt water as it is in fresh."

Relative to the genesis of fish-poisoning practice among the Queensland aborigines, regard is had to the possible acquisition of poison lore due to external influence, the independent adoption of the practice from chance observation, and to the evidence for experimentation leading to the distinction of toxic from non-toxic plant varieties.

The universality of the practice in Malaysia and the Islands has been referred to. *Derris* and *Tephrosia* species, widely used for the purpose, are common fish-poisons both in the Archipelago and Polynesia, and among tribes in Northern Queensland. The possibility of the introduction of the custom from such quarter must be judged on general grounds and by the standard of recognised external influence upon aboriginal customs.

Considering the universality of fish-poisoning it is not unjustifiable to assume an independent origin among the Australian aborigines, and the evolution of an empirical knowledge of efficient piscicides. The aboriginal himself would appear to have retained no notion of the origin of the art. His impression conveyed in his own way, "Black fella come up first time, catch 'em!" denotes the bequest of an unwritten lore through generations. Further his child-mind seeks for no explanation, nor is it legitimate to press for reason an intelligence

[2] 25th Book Natural History, chapter 54.

NATIVES ON A HUNTING AND FISHING EXPEDITION, CARRINGTON, NEAR ATHERTON, N.Q.

The illustration shows the methods of carrying small children, still in vogue, and the attachment of the dillybag by means of its lawyer-cane handle to the forehead of the older man so as to leave the hands free for other tasks.

The waterhole is adapted to fishing by poisoning, the fish when secured being carried home in these dillybags.

*A. Atkinson, photo.*

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that is at best but that of an overgrown youth. The explanation of E. J. Banfield that the need of the moment supplied the need of the moment, that the native fisher resorted to plant material abundant and ready to hand, though probably accounting for the first employment of fish-poisons, subsequently from their recognised efficiency adopted and widely used, does not suffice for the general and deliberate usage of plants of marked and certain toxic qualities—usage dictated, it seems, by distinct foreknowledge and intent. The recent use as a poison of the exotic *Asclepias curassavica* by natives on the Don River, and which may be supposed to be frequently efficacious from its botanical association with other Asclepiadeæ, is an instance of the extension of aboriginal poison lore, probably as a result of experience, though the usage of the innocuous *Sarcocephalus cordatus* and *Pleiogynium solandri*, recorded as fish-poisons from the Proserpine district, warrants the opinion quoted—that plant material was used without direct recognition of its effectivity or non-effectivity, probably sometimes because it was readily obtained. The use of *Alocasia macrorrhiza*, which at least is likely to prove not certainly efficacious (from the abundant occurrence of the plant in moist and low-lying situations often adjacent to watercourses), may be cited as an example of the tendency to resort to material conveniently and expeditiously obtained. It may be surmised that the employment of *Polygonum* species was first dictated by similar circumstances.

The use or successful use of certain poisons was indubitably prescribed in measure by natural circumstances. If, for instance, the toxic principle of *Diospyros hebecarpa* is confined to the fresh fruit, poisoning by such means would be limited to seasons at which the plant is in bearing. Similarly, species of *Acacia* and *Albizzia* would vary in efficacy with seasonal variation in tannin content or with seasonal elaboration of sapotoxin.

The poison "Nero," which is gathered from mangrove-fringed and swampy foreshores, would be available only at drier portions of the years when its habitat is accessible. Foreknowlege of the more highly efficient plant material is shown in the almost exclusive employment of *Derris* and *Tephrosia* in certain localities, and in the preference for the sapotoxin-containing *Cupania* and of *Derris* species by the Cardwell natives. It would appear certain, however, that, in case of dearth of more potent material, plants of lesser efficacy were in many cases resorted to. It is noted that the less efficient poisons include *Acacia*, *Albizzia*, *Eucalyptus* species, *Pleiogynium*, *Sarcocephalus*, and *Terminalia*. *Acacia*, *Albizzia*, and *Eucalyptus* are of widespread and plentiful occurrence; *Pleiogynium*, *Sarcocephalus*, and *Terminalia* are abundant in localities. It is probable, therefore, that the ease of obtaining plentiful supplies has predetermined the adoption and use of some material. The comparative scarcity of the saponaceous fruit of *Castanospermum australe* would be unfavourable to its utilisation in fish-poisoning, though it may be surmised that its utility as a food would be similarly operative.

The recognised value of certain plants in furnishing food may, however, have led to the extension of their utility in the adoption of portions for the purpose of obtaining fish. The fruit of *Faradaya splendida* is edible; the bark constitutes a powerful and effective fish-poison. The fruit of *Barringtonia speciosa* is eaten in season in the Townsville district; the bark is valued for its effect on fish when introduced into suitable bodies of water. Similarly, the prepared rootstock of *Alocasia* is a food; the aerial part has been resorted to for the taking of the denizens of the streams. *Polygonum hydropiper* was also used as a food. The association of fish-poisoning property in certain plants with medicinal virtue is also noted. *Petalostigma quadriloculare* is employed in the Oaklands (Cairns) district as an antidote for opium; the bark of an

unidentified specimen as a stimulating or perhaps sedative medicine. *Asclepias curassavica* is regarded as possessing virtue as a love-charm in the Pennefather district. Medicinal property was also attributed to the leaves of *Careya australis*. The recognition of the superior efficacy of portions of certain plants for the purpose designed is evident. The bark alone of *Cupania pseudorhus* is utilised by the Cardwell and Hull River natives, and the experiments of the authors demonstrate the leaves to be non-toxic and saponin-free.

Similarly, the stem of *Derris uliginosa*, widely employed, is toxic, the leaves ineffective. The frequent preference for barks as fish-poisons may be surmised to be due to experience of their higher efficiency, as would be expected from the storage therein of excretory products of a toxic nature. The use of the roots of *Tephrosia rosea* in the Mapoon locality to the exclusion of the aerial parts cannot, however, be accounted for on similar grounds, as both root and stem are, according to the authors' trials, equally efficacious.

The recorded differential use of certain plants or parts of plants in fresh or salt water is not readily explicable. There is no reason, in the nature of the toxic principle involved, for the restriction of the employment of *Derris uliginosa*—which is elsewhere used indiscriminately—by the Cardwell natives to fresh waterholes; nor is it apparent why, as stated by James Murrell,[3] the bark of the stem of the "broad-leafed apple-tree" ("Barkabah") was used in fresh water and the bark of the root in salt. The repeated statements of correspondents that a material was utilised either in fresh or salt water, or only in one or the other, would indicate that such a differentiation was clearly drawn, and the statement "No good in salt wata, he grow there, carn kill fish!" though obviously logically at fault, furnishes, nevertheless, an instructive example of aboriginal reasoning. E. J. Banfield, however, informs us that the poisons *Derris uliginosa*, *Faradaya splendida*, and *Careya australis* were used at Dunk Island almost solely in salt water, for, except for the eel, the fish in freshwater pools are too insignificant even for the blacks. Neither is the reason of the special method of preparation recorded for *Cupania pseudorhus* (baking in the native oven), or of such procedure as rubbing the bark of *Faradaya splendida* on heated stones, obvious. The nature of the active principle does not permit of elaboration by such means, which had originally perhaps only ceremonial import. The method of application is universally in Queensland by infusion in the habitat, the poison becoming active through subsequent absorption through the respiratory organs. The method consequently restricts the practice of the art to water of small dimensions; elsewhere it is not an infrequent custom to throw fragments of the more poisonous portions of the plant into the water, thereby inducing the fish to swallow them with fatal result. One such instance is to be found in the methods of the Bismarck Archipelago Islanders.[4] The seeds of *Barringtonia speciosa* are ground and thrown into water, when fish snap at them and become stupefied.

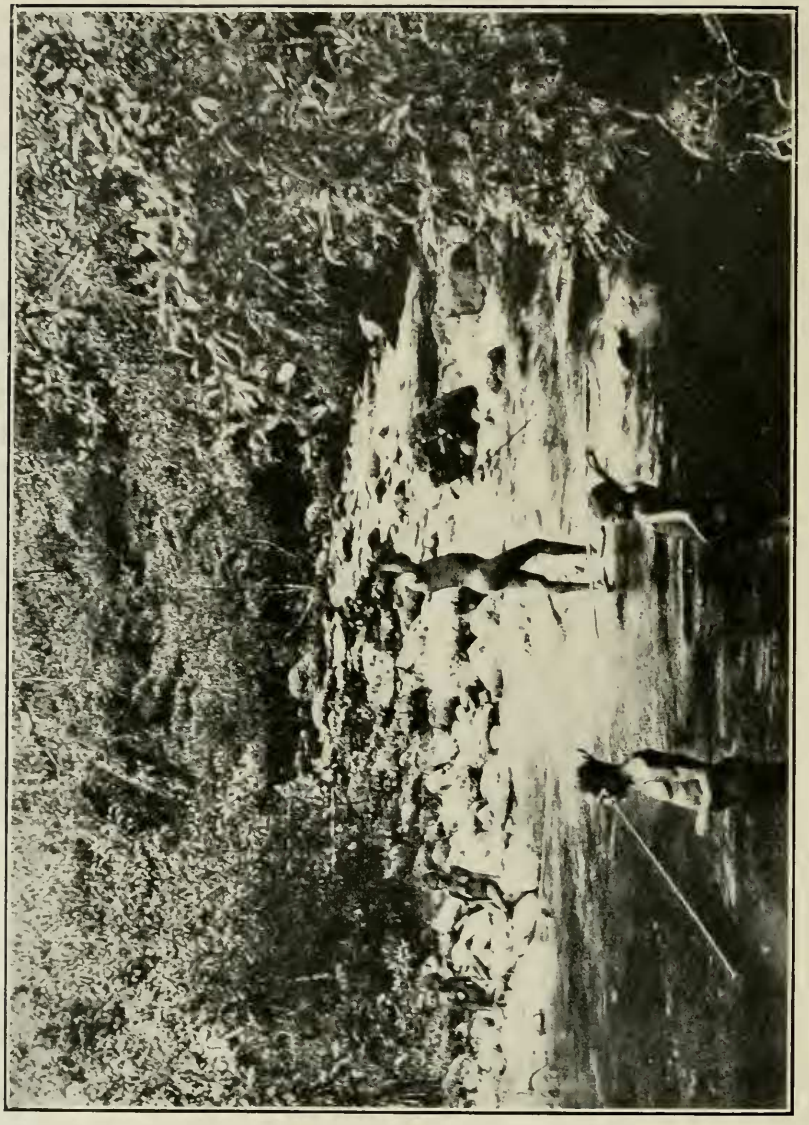
In the Gazelle Peninsula[5] (Matupi) poisoning is effected by means of small fish whose stomachs are filled with vine-roots pounded; the larger sea-fish then take them and become intoxicated. Sometimes, as is the case in Samoa,[6]

[3] Edmund Gregory, Narrative of James Murrell's Seventeen Years' Exile, &c., Brisbane, 1896 (1863).

[4] Biro Lajos. Daten zur Schiffahrt und Fisherei der Bismarck-insulaner. Anzeiger der Ethnographischen Abteilung der Ungarischen National-Museums. Buda Pest 1905, p. 57.

[5] R. Parkinson, Dreissig Jahre in der Südsee, 1907, p. 101.

[6] George Brown, D.D., Melanesians and Polynesians, 1910.



NATIVES SPEARING FISH IN BABINDA CREEK, N.Q.
The creek is typical and suitable for the application of fish-poisons.
*A. Atkinson, photo.*

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the natives add the poison to a palatable morsel, thereby ensuring a greater efficiency. Dr. Brown reports that *Tephrosia piscatoria* is thus mixed with taro, and the fruit of *Barringtonia speciosa* is used for the same purpose.

There would appear to be sufficient grounds for crediting to the aboriginal user some sense of the actual toxic property of his instruments rather than the attribution of their efficacy to magical influence. Codrington,[7] writing of Melanesia, gives expression to the belief that native magicians attributed any noxious qualities which a poison might possess, not to its natural toxic principles, but to the magic charm which possessed the power of poisoning and which was communicated to it.

From the universality and dominance of belief in magic in aboriginal communities, we are not inclined to entirely exclude it as an actuating influence in fish-poisoning practice. The degree, however, to which the effects obtained was so attributed it is not possible to say. Nevertheless, there is certainly recognition of the specific influence of the plant in the instance vouched for by M. J. Colclough. Questioned as to why he supposed the fibrous stalk of the red-flowered water-lily (not obtained or identified by us), growing in profusion at Joe's Hole and Red Lily Lagoon at the head of the Roper River, affected fish, the native fisherman replied, "Saucy fella sit alonga that one, kill 'em fish, make 'em sick first time!"—from which is to be gathered the train of aboriginal reasoning.

A remarkable example of the distinction of natural poisoning from supernatural influence is found among the Narrinyeri tribe of the Lower Murray and Lakes Alexandrina and Albert. As E. C. Stirling points out, in contradistinction to the usual paraphernalia of "pointing sticks and bones" which were charmed or "sung," the "Neilyeri" was stuck into a putrefying corpse for two or three weeks and consequently acquired a special deadliness in use. There are few instances such as this of the direction of poison against fellow-man in Australia, and a similar practice observed by Dr. Herbert Basedow, whose observation is independently corroborated, may be cited. Among the Wogait and Ponga-ponga tribes on the Daly River, the vertebræ of large fish, principally barramundi, after insertion into decaying tissue, usually the putrid carcass of a kangaroo, for several days, were collected and tied to the head of a fighting-spear. This was done upon special occasions only, and the weapon was not allowed out of the owner's hand: with which the natives declared they could "kill quick fella!"

We can recall no parallel practices in Queensland; aboriginal familiarity with antidotal or remedial measures, however, is evident. The use of herbs as antidote for opium has been referred to, and M. J. Colclough relates the measures taken for treatment of snakebite. A native bitten by a venomous snake was seen cutting himself deeply with a shell knife, and tearing the flesh to induce copious bleeding, the while forcing the blood to run down his leg by energetic massage. The instance shows a knowledge, either intuitive or acquired, that is remarkable. The more recent adoption, by contact with civilisation, of poisoning practice is perhaps apparent in the "poison-carriers" collected by Bishop White (lately of Carpentaria) on the Roper River, and sent by him to the Queensland Museum. The donor, in explanation of their purpose, writes: "As near as I can remember the blackfellow told me their significance in the following words—'Man no likee, kill 'um poison his tucka, all the same white man!' " The specimens (231 mm. and 206 mm. in length) consist of the shaft of an ulna and shaft of a radius of

[7] R. H. Codrington, D.D., The Melanesians, 1891.

the pelican, and would suffice to hold considerable quantities of poison, for the conveyance of which it is surmised they are adapted and in which they may have been employed.[8]

A similar object, a human shin-bone, in the Adelaide Museum Ethnological collection, and described as "found in blacks' camp (Lake Albert), and said to have been used for carrying a fluid poison," would indicate a well-defined toxicological knowledge, probably of earlier date.

The possible use of the "poison-carriers" as vehicles for the death-pointer is not, however, lost sight of. The only one, to our knowledge, extant is a "box" of pelican wing-feathers presented, we understand, by Roth to the Australian Museum, and is distinct in form from the specimen described.

Methods and Material.—Palmer,[9] and later Roth,[10] have published lists of fish-poisons in use among the aboriginal communities of portions of the eastern littoral and in the inland areas of North-West-Central Queensland and the Gulf of Carpentaria. These include many submitted as authenticated specimens to us. Our collection, however, covers some new ethnographic ground, and further has been treated from the aspect of actual effectivity as established by a series of physiological experiments with test fish.

For this purpose Trout Gudgeon (*Krefftius adsperus* (Castelnau)), Firetail (*Austrogobis galii*, Ogilby), Sunfish (*Melanotænia nigrans* (Richardson)), of Southern Queensland freshwater streams, have been utilised, and, for the distinction of poisons exhibiting markedly certain and rapid action from those of less well-defined toxic property or of tardy and uncertain effect, infusions of an arbitrary concentration of one part plant material in one thousand parts of water have been employed. The determination of actual effectivity would seem to us to have ethnological importance in its bearing upon the question as to whether adoption of certain material was dictated by certainty of its potency or by a faith rather in efficacy of the practice as such.

The reliability of deduction as to general efficacy from the premise of observed effect is, we judge, not absolute on more than one ground: the effectivity of air-dried and stored specimens, with which the experimental work has been conducted, may have undergone considerable diminution: certain varieties of fish other than those employed may be more susceptible to the poisonous effects of some plant materials (Hanriot so differentiates for *Tephrosia*), and seasonal alteration may account for diminution or disappearance of activity. The last-mentioned probability, though warranting assumption of greater potency during period of greater elaboration or storage of toxic principle, invests, still, the material with unreliability in use.

The collection of a series of authenticated fish-poisons has presented opportunity for chemical examination as to the nature of the toxic principles involved in their action. Question has recently[11] been raised in connection with the Sierra Leone fish-poison, *Pentaclethra macrophylla*, as to the efficacy of tannin (of which the specimen was found to contain 7·1 per cent.) as a piscicide. Our experiments show marked physiological disturbance and ultimate death of fish in solution of tannic acid (Mercks pure) of 1 in 10,000 concentration, and infusions of one part of the common tannin agents, Myrobalans and Valonia, in

[8] R. Hamlyn-Harris, Abstract of Proceedings, Roy. Soc. Q., vol. 27, 1915.

[9] E. Palmer, Notes on some Australian Tribes, Journ. Anthrop. Instit., vol. 13, 1884, p. 321.

[10] W. E. Roth, North Queensland Ethnography, Bull. 3, 1901, p. 19.

[11] Bull. Imperial Inst., vol. xiii., No. 1 (1915), p. 47.

3,000 parts of water. This in conjunction with the slow effectivity of *Terminalia sericocarpa* (8 per cent. tannin) and *Eucalyptus* species (6 per cent.) in which no other principle likely to be toxic could be discovered, and the innocuity of material free from tannin, warrants us in the conclusion that materials containing tannin in relatively small percentage are efficacious in use but that their efficacy depends on their employment in relative abundance, as indeed is indicated by the notes of observers relating to the use of *Eucalyptus* and *Acacia* species.[11a]

The identification of sapotoxin as the active principle of *Careya, Cupania, Faradaya,* and *Garcinia,* of derrid in indigenous *Derris* species, and the indication of tephrosin in *Tephrosia rosea* and *T. purpurea,* serves to indicate the extreme potency of these materials, here as elsewhere due to these principles, and is presented also as a contribution to the pharmacology of the indigenous flora.

Our observations lead us to adopt a classification, based on efficiency, of the fish-poisons investigated by us, as follows:—

GROUP A.—*Effective and rapid in action at great dilution.—Derris, Tephrosia. Pongamia, "Nero,"* containing active principles associated with ether-soluble resins. The sapotoxin-containing *Careya, Cupania, Faradaya, Garcinia.*

GROUP B.—*Poisons of intermediate effectivity.—Barringtonia speciosa. Stephania hernandiæfolia,* alkaloid-containing.

GROUP C.—*Poisons of lesser effectivity.*—Slow in action at higher concentrations or uncertain in action. *Acacia, Albizzia, Eucalyptus, Thespesia, Terminalia, Polygonum.*

GROUP D.—*Reputed poisons, found innocuous.—Sarcocephalus, Pleiogynium, Petalostigma, Alocasia, Asclepias (?).*

Identified species recorded elsewhere, not examined by us:—

*Acacia salicina,* var. *varians* (Maiden), N.S.W.;

*Acacia falcata* (Maiden), N.S.W.;

*Acacia penninervis* (Maiden), N.S.W.;

*Acacia verniciflua* (Lauterer), Bathurst;

*Acacia salicina,* Roth.

*Adenanthera abrosperma* (Roth);

*Bauhinia* sp. (Ewart and Morrison), N.T.;

*Barringtonia racemosa* (Palmer);

*Derris scandens* (E. J. Banfield);

*Eucalpytus resinifera* (Roth);

*Eucalyptus corymbosa* (Mathews), Western Australia;

*Galactia varians* (Roth);

*Luffa ægyptiaca* (Palmer);

*Melia composita* (Roth);

*Tephrosia astragaloides* (Roth); and

*Acacia auriculiformis* (seeds), on the authority of G. F. Hill, Darwin.

[11a] Greshoff (13) recognising the effectivity of tannin-containing materials, follows Claude Bernard in ascribing to tannic acid an astringent effect and interference with the function of the gills (p 35).

## Order MENISPERMACEÆ.

### STEPHANIA HERNANDIÆFOLIA, Walp.

"NJANNUM," Nerang, Q.

The only record of the use of *Stephania hernandiæfolia* as a fish-poison is made by J. Shirley,[12] in the Nerang district. Of other members of the Order, *Anamirta paniculata*, Colebr., is a fish-poison in India (*Watt. Greshoff*)[13]; and *A. cocculus*, Wight, Arn. (usually regarded as a synonym), constitutes perhaps the most used material for the purpose in Malaysia.[14]

In test experiments, infusions of *S. hernandiæfolia* were found to be certain but comparatively slow in action; there is absence of the excitation produced with *Derris*, *Tephrosia*, and the saponin-containing *Cupania* and *Careya*. Furthermore, fish exhibit a tendency to remain in depths till death overtakes them; a condition not, it is supposed, tending to ready capture.

Rennie and Turner[15] have separated picrotoxin from *Stephania*, and Bancroft[16] found it to be rich in alkaloid. Separation of the alkaloid and of a supposed picrotoxin fraction, following the procedure of Rennie and Turner, showed the former to be rather slowly toxic at concentration 1 : 50,000; with the latter no physiological effect was observed. The alkaloid is probably the chief active constituent of the poison, and to alkaloids are ascribed the effectivity of the Cameroon fish-poisons,[17] *Strychnos aculeata* and others.

## Order GUTTIFERÆ.

### GARCINIA CHERRYI, Bail.

*G. cherryi* is recorded by Roth[18] as a Queensland aboriginal fish-poison, and samples have been obtained by us through the courtesy of D. J. Mocatta, of Atherton.

Our experimental results show a high efficiency and rapidity in use, the bark being more potent than the leaves. The plant is highly sapotoxic; aqueous infusions show extreme frothing power, and the watery extract of the bark slowly hæmolyses blood corpuscles at a dilution of 1 : 50,000.[19] A lesser saponin content is indicated for the leaves.

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[12] J. Shirley, A Fish-poison of the Aborigines, Proc. Roy. Soc. Q., vol. ii., pt. ii., 1896, p. 89-91.

[13] M. Greshoff, Beschrijving der giftige en bedwelmende planten bij de vischvanget in gebruik (Batavia 1900).

[14] Tenison-Woods, Rev. J. E., Fisheries of the Oriental Region, Proc. Linn. Soc. N.S.W., vol. iii., 1888.

[15] Rennie, E. H., & E. F. Turner, On the Poisonous Constituents of *Stephania hernandiæfolia*, Walp., Trans. & Proc. Roy. Soc. Sth. Aust., vol. 17, 1892-3.

[16] Thos. L. Bancroft, Preliminary Notes on the Pharmacology of some new Poisonous Plants, Proc. Linn. Soc. N.S.W., vol. iv., 2nd series, 1889.

[17] E. Fickendey, Zeit. Angew. Chem., vol. 23, p. 2166-7, Chem. Abstracts, vol. 5, 1911, p. 2901.

[18] Roth, W. E., Food, its Search, Capture, and Preparation, North Queensland Ethnography, Bull. No. 3, 1901, p. 19.

[19] In the statement of hæmolytic power, the figures 1: 5,000, for instance, mean that blood corpuscles are hæmolysed in suspension in a liquid infusion of plant material diluted to that strength. Thus the result reported is observed on addition of ·5 c.c. of 1 in 500 infusion to 4·5 c.c. of 1 per cent. suspension of corpuscles.

## Order MALVACEÆ.

**THESPESIA POPULNEA,** Corr.

A less effective fish-poison of the Normanton district, where it is vernacularly known as "Mangrove Apple," "Mangrove Pear," or "White Mangrove." We have demonstrated its ability to cause stupefaction and death of fish at higher concentrations.

## Order BURSERACEÆ.

**CANARIUM AUSTRALASICUM.**

"KAME," Batavia River.

"TCHALU-JI," Bloomfield River

(Comprehensive Catalogue of Queensland Plants).

The use of the wood of *Canarium* species as a fish-poison is reported elsewhere (*Greshoff*). A specimen of bark and leaves of *C. australasicum* forwarded as a fish-poison from Darwin by G. F. Hill, however, appeared to have no marked physiological effect on fish immersed in its infusion.

## Order SAPINDACEÆ.

**CUPANIA PSEUDORHUS,** A. Rich.

"GILLIBUDGEN," Cardwell Dist., Q.

"KIRIBAN," Hull River, N.Q.

*C. pseudorhus* is a small tree growing to the height of twenty feet in scrubs along the banks of freshwater creeks and in forest country adjoining scrubs in the Cardwell district. The tree is said to be not plentiful, but its bark is an effective poison in either fresh or salt water and has a great reputation among the natives (*S. Creedy*).

J. M. Kenny, writing from the Hull River, states: "The bark is carefully scraped from the tree trunks and limbs and cooked in native ovens for about half an hour; then, when taken and put into a pond and well mixed in the water still held in dilly-bags, soon acts on the fish."

Maiden[20] writes: "It is stated that the aborigines used the pounded bark to stupefy fish in waterholes. It is a native of the north-east of N. S. Wales. and is also found in Queensland."

The bark is a rapid and powerful piscicide, producing excitement, stupefaction, and paralysis, and, in concentration 1 : 1,000, death in less than one hour. An infusion of the leaves was found to exercise no notable physiological effect, and the preference of the natives for the bark appears well founded. An infusion of the bark shows the characteristic sapotoxin reaction of frothing at an extreme dilution of 1 : 10,000, and hæmolyses blood corpuscles at a concentration of 1 : 14,000. The saponin obtained by extraction with hot 80 per cent. alcohol and deposition on cooling, with subsequent purification by solution in chloroform, gave the characteristic cherry-red colouration with concentrated sulphuric acid, but had preserved neither frothing nor hæmolytic power. The leaves were proved saponin-free.

*Cupania* sp. are listed by Greshoff as cyanophoric plants.

[20] General Report of the Sydney Intern. Exhibition of 1879. J. H. Maiden : Fish Poisons of the Australian Aborigines, Agricultural Gazette, N.S.W., 1894.

## Order ANACARDIACEÆ.

**PLEIOGYNIUM SOLANDRI**, Engler.

This plant is known at the Proserpine as the "Burdekin Plum," and is referred to as one of the lesser important fish-poisons of the district. The inner layer of the bark is used, being scraped off, pounded, and put into a bag or net, which is thrown into the pool.

Except in considerable concentration, when the material would appear to function as a temporary stupefacient, no physiological effect was obtained in test experiments. The bark is tannin-free.

## Order LEGUMINOSÆ.

**DERRIS ULIGINOSA**, Benth.

"BUGGERA-BUGGERA," Ingham, N.Q.
"PUCKERA," Halifax, N.Q.
"MURRI" (MURI), Rockingham Bay, N.Q.
"BAGGARA," Dunk Island, N.Q.
"URUM," O'Connell River, N.Q.

This vine constitutes one of the most effective and rapid fish-poisons. On the O'Connell River the plant is disintegrated, placed in nets, and infused into the water of small lagoons.

Inspector Sweetman, of Townsville, supplies the following information concerning its use in the Ingham district:—"The vine is cut up into two-feet lengths, sticks of about a finger's thickness being preferred. They are beaten and bruised and handfuls thereof taken and thrown into the water, where they are again beaten and worked about. Fish quickly stupefy and, rising to the surface, are easily caught or speared.[21] The method is only practicable in

[21] Spearing was mostly accomplished by "Muttock," a four-pronged spear about eight feet long. These prongs were made of hardwood from eighteen inches to two feet long, about a quarter of an inch in diameter at the thick end and gradually tapered off to the point. These would be fitted into a dry but strong and firm grass-tree which was usually grown straight, but if it happened to be a little out of plumb the blackfellow would wet it well, and after it had soaked a bit into the wood he would hold it over the hot ashes until it steamed, and would place it sideways in his mouth, hold it across his teeth, and with a hand on each side lever the stick; this he would repeat several times until he got it straight. That performance over, he would take the stalk of the leaf of the cabbage-tree palm, split away the outer portion which he would retain, and with the aid of a stone shell, or his nails, if he could not get a knife or a bit of glass, pare it down until he secured the proper consistency, and as the grain runs straight, the width, generally about a quarter of an inch, would easily be obtained. This he would bind tightly around each end of the grass-tree for about one or two inches to prevent it splitting, and seal it over with grass-tree resin made into a gum-cement. He would then get a piece of hardwood, not so wide as his grass-tree and about six inches long, fit it in the ground, then sit down holding the stick between his feet, then reverse the grass-tree on to the point of the stick, give a few twirls, rotatory, and quickly make a hole large and deep enough to hold the prongs. Each prong would then be heated and rubbed over with the gum, and then the whole four would be fixed up, the points being kept about two or three inches apart with small pieces of wood, then bind all together with the cabbage-tree tape. Each prong would be fitted with a strong, sharp, bone point. (*T. Illidge.*)

comparatively small waterholes. It is useless in running water, and acts better in fresh than in salt."

Specimens of a similar vine have been received from W. C. Minniss, Mabuiag Is., Torres Strait, under the native name "Sagee." It has there the reputation of an effective and rapid poison, the stem only being used, and has been identified by C. T. White as a species of *Derris*. While the specific naming has not been possible, we are assured of its identity with *uliginosa*, which is plentifully distributed on the mainland and islands.

A *Derris* has been received from Whitten Bros., Samarai, Papua, as a fish-poison locally known as "Wild Dynamite."

*Derris uliginosa* has also been forwarded by J. S. Bruce from Murray Island, where it is known as "Sud."[22] The material was taken to lagoons on the reef in small bundles (at low water), and, after beating up with stones, immersed till the water became milky. The fish, forced from their holes, came to the surface stupefied. Mr. Murray reports that since the advent of hook and line the practice has fallen into disuse.

According to Maiden the plant is used for fish-poisoning purposes in many tropical countries.

The experiments of the authors confirm the extreme utility and effectiveness of the plant as a stupefacient. The test fish, first evidencing considerable excitement, rapidly became stupefied and periodically rose to the surface. An infusion of one part of dried stem in one thousand parts of water proved fatal in under an hour. The rapidity of action, it may be surmised, has earned for the plant the name of "Wild Dynamite" among the natives of Dunk Island.[23]

**DERRIS KOOLGIBBERAH**, Bail.

"GERRENI," "Poison Rope," Edmonton, N.Q.

A scrub vine similar to *Derris uliginosa*, which it simulates in action, and in test experiments proved almost equally effective.

Greshoff records the use of various species of *Derris* as fish and arrow poisons in the East, ascribing the activity of *D. elliptica* to a resinous body, derrid—soluble in alcohol, ether, chloroform, and amyl alcohol, and sparingly soluble in water and potash solution.

Derrid is characterised by Hartwich and Gieger[24] as giving a blood-red colouration with concentrated sulphuric acid containing a trace of ferric chloride.

Pure derrid, isolated from *D. elliptica*, has since been described by Sillevold,[25] who assigns to it the formula $C_{33}H_{30}O_{10}$ and melting point 73° C.

*The Identification of Derrid in D. uliginosa and D. koolgibberah.*

The ether-soluble resin of both *D. uliginosa* and *D. koolgibberah* proved completely soluble in alcohol, chloroform, and amyl alcohol, and strikes a brown colour with concentrated sulphuric acid, and blood-red with sulphuric acid and ferric chloride.

[22] Haddon, A. C., "Hunting and Fishing" Reports, Cambridge Anthropological Expedition to Torres Straits, vol. iv., 1912, writes of this as "Sad."

[23] Banfield, E. J., The Confessions of a Beachcomber, 1908, p. 269.

[24] Hartwich and Gieger, Archiv. Pharm., 1901, vol. 239, pp. 491-505; Abs. C.S.J., 1902, vol. 82, pt. i., p. 114.

[25] *Vide* Hanriot, Comptes Rendues, 1907.

Purification by removal of soluble material in dilute potash solution and re-solution of the residue in large volumes of water, whence it was obtained by shaking out with ether, yielded a white waxy body giving the characteristic colouration with sulphuric acid and ferric chloride and melting at 68°-72° C. The purified compound is extremely toxic; a concentration calculated at 1 part in 3,000,000 proved rapidly fatal to test fish. Greshoff states his material to be effective at 1 : 5,000,000.

The presence of saponin is also indicated in *D. koolgibberah*. An infusion of 1 : 80 concentration slowly hæmolysed a suspension of red corpuscles.

**TEPHROSIA ROSEA**, F. v. M.

" TE-UMA " of Mapoon and Pennefather River natives.

This shrub is one of the most effective poisons used in Cape York Peninsula.

The use of *Tephrosia* species has been almost universal. Among ten different species of fish-poisons used in the Oriental region two are common to Queensland, viz., *Derris uliginosa* and *Tephrosia*.[26] Among the North American Indians certain roots were used (that of a species of *Tephrosia* most commonly) "so that the stupefied fish could be secured by means of bows and arrows" (*Speck*).[27] *Tephrosia vogelii*, Hook., is used with effect in Rhodesia,[28] and the use of *T. toxicaria* and *T. periculosa* is referred to by Greshoff.

*Tephrosia purpurea*, Pers., the "Etu-Maru" of the Torres Strait natives, has been forwarded to us from Mabuiag Island by W. C. Minniss, who states that the whole plant is employed. It is surmised that the plant, being indigenous to Queensland, was probably also used here, though we have no record of the fact. *T. astragaloides*, H. Brown, is referred to by Roth as employed in the Cloncurry and Upper Flinders River districts.

Two species of *Tephrosia* have been observed in use in the Northern Territory. A specimen in the Adelaide Museum is marked *T. lamproloboides*, and comes from that indefatigable collector and observer, T. Foelsche. *T. purpurea* is referred to by Ewart and Morrison in their " Flora of the Northern Territory."[29] In the Territory, however, the art would appear to have been restricted in its application. M. J. Colclough informs us that he saw no poisons in use along the coast in the Roper River district, where the country is crossed by running streams but pools are at a discount. Here fish are obtained in shallow water by spearing, and in deep water the natives not only spear but resort to the use of fish-traps with a funnel-shaped entrance or drive at the mouth. In localities where from the presence of pools poisoning might be resorted to, the danger of crocodiles eating the catch limits the practice.

Neither Stirling nor Baldwin Spencer makes any mention of the use of poisons as far south as Central Australia. The former, in a letter to one of the authors, states "that he has never heard of the custom in the MacDonnell Ranges, where, from the localised and restricted conditions of the waters, it might be practicable. The natives there do, however, poison with pituri (*Duboisia hopwoodii*) the water where emus drink."[30]

[26] Tenison-Woods, Rev. J. E., Proc. Linn. Soc. N.S.W., vol. iii., 1888.

[27] *Vide* Handbook of American Indians, Bureau Amer. Ethn., Bull. 30, " Poisons."

[28] Investigations of Vegetable Drugs and Poisonous Plants, Bull. Imp. Institute, vol. 13, No. 1, 1915, p. 28.

[29] A. T. Ewart & A. Morrison, Contributions to the Flora of Australia, No. 21, Proc. Roy. Soc. Victoria, vol. 26, pt. i., 1913.

[30] E. C. Stirling, Anthropology, Horn Expedition, 1896, vol. 4, p. 52.

The experiments of Hanriot dealing with the action of tephrosin, the poisonous principle of *T. vogelii*, show that "when a fish is placed in a dilute solution it shows great excitement at first but soon becomes quiet. The fins lose colour and become paralysed and the fish turns over and eventually dies." Our experimental results with *T. rosea* and *T. purpurea* are in agreement except that no paling of the fins could be observed. The action is extremely rapid.

*The Occurrence of Tephrosin in T. rosea and T. purpurea.*

Hanriot has isolated from *T. vogelii* a poisonous principle, tephrosin (M. Pt. 187° C.),[31] a volatile oil, tephrosal, and an uncharacterised yellow body; and more recently his results have been confirmed on material from Rhodesia in the laboratories of the Imperial Institute. Experimental work on *T. rosea* and *T. purpurea* demonstrates the presence of probably identical bodies in these species. Following substantially the method of Hanriot, extraction with alcohol and distillation of the extract in steam, a pungent yellow oil passed over which is thought to be identical with tephrosal. The evaporated residue is treated with chloroform, and the chloroformic solution precipitated with ether. Resinous bodies are removed by agitation with aqueous alkali, and the ether-chloroform solution evaporated. The residue was found to be yellowish and hemi-crystalline, and the residue from evaporation of acetone solution is also markedly crystalline; the crystals being associated with a yellow body from which is was impracticable, with the material available, to completely separate them.

Concerning the toxicity of the final product there can be no doubt; a concentration approximately 1 : 1,000,000 proved fatal to test fish in half an hour.

**PONGAMIA GLABRA**, Vent.

The plant is recorded by Roth as a Queensland native fish-poison as follows:—" After being roasted, the roots are beaten upon a stone, tied in bundles and thrown into the water which turns somewhat greenish; it is put in of an evening and left there all night."

Botanically allied to *Derris* and *Piscidia*—the latter given as a fish-poison by Greshoff—its action is rapid and effective, the leaves being only less potent than the root. The active principle is found to reside in the ether extract of the root, and may be identical with or allied to the pachyrhizid, timboine, and tephrosin of other leguminous plants. Its failure to give a blood-red colouration with sulphuric acid and ferric chloride distinguishes it from derrid of genus *Derris*.

**ALBIZZIA PROCERA**, Benth.

*A. procera* was received by us through Sergeant Geary, described as an *Acacia*, from the Proserpine district, with the statement that the inside of the bark alone is used. The specimen did not prove certainly effective, the physiological effect being slight. Lauterer[32] and Bancroft[33] have, however, pointed out the transitory nature of the occurrence of saponin in the plant, and in certain *Acacias*, and at seasons more positive results would probably have been obtained. It is scarcely credible, though, that the aboriginal could distinguish periods of maximum effectivity, and *Albizzia* would probably in his hands constitute an uncertain instrument.

[31] Bull. Imp. Institute, vol. 13, No. 1, 1915.

[32] Joseph Lauterer, Occurrence of Saponin in Australian *Acacias* & *Albizzias*, Proc. Roy. Soc. Q., vol. 12, 1896, p. 101-7.

[33] T. L. Bancroft, On the Discovery of Saponin in *Acacia delibrata*, Cunn., Proc. Roy. Soc. Q., vol. 4, 1887, p. 10.

**ACACIA SP.**

"WAKA," Normanton, N.Q.

Greshoff records the use of *Acacia* and allied genera as fish-poisons in Burma and elsewhere, and Maiden mentions three species of *Acacia* as so used, viz.:—*Acacia fulcata*, Willd., "Wee-Tjellan"; *Acacia penninervis*, Sieb.; *Acacia salicina*, var. *varians*.

Brockmann, in his "Report on the Exploration of North-West Kimberley," says of the natives: "With the coarse grass and wattle-bark they make what looks like an enormous straw bottle; the inside of this they fill with the bark obtained from the root of a shrub which grows along the banks of the rivers, and which is known on the Fitzroy as 'Majalla,' and then drag it backwards and forwards through the pool, the result being that the fish become stupefied and come to the surface, and they are easily caught. Whether the stupefying effect is due to the bark or to the stirring-up of the mud Dr. House does not know; probably both are factors in the case."[34]

Our own experiments with water muddied with suspension of clay show that such factor, beyond inducing slight abnormality of behaviour, is inoperative. Mr. T. Welsby, indeed, in his book on "Schnappering" (Brisbane, 1905), makes reference to a native mode of catching fish by muddying water with a greasy greyish-blue clay, and driving towards a specially prepared dam, when, rising gasping to the surface, they were taken. With the experience of the non-effect of mere "muddying," however, we are inclined to attribute the apparent success of the practice rather to the mechanical disturbance due to the invasion and beating of the water by the large number of fishermen. Similarly, in the occasionally observed mortality among fish in turbid flood-waters, the muddiness must be considered an insignificant contributing factor, the true cause probably lying in de-oxygenation of the stream waters by washing in large quantities of oxygen-absorbing material.[35] In the instance quoted the use of wattle-bark may have had an adjuvant effect, though the "Majalla" must probably be regarded as the effective substance.

Certain species of *Acacia* are known to be rich in tannin and to be saponin-containing, the development of the latter occurring principally in the seeds and pods.[36] Greshoff states that the species likely to be most effective are those rich in tannin and bearing saponaceous seed-pods. The specimen contained 3 per cent. of tannin, and had but slight physiological action at concentration 1 : 1,000.

## Order COMBRETACEÆ.

**TERMINALIA SERICOCARPA**, F. v. M.

DAMSON PLUM, Proserpine District.

Test experiments demonstrate the bark of *T. sericocarpa* to be a fish-poison of lesser effectivity, producing death in sufficient concentration. *T. laurinoides* and *T. tomentosa*, on the authority of Greshoff, were used for the purpose elsewhere (*Liotard, Elliot Watt*). No toxic principle other than tannin, of which 8 per cent. is present, could be demonstrated.

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[34] Brockman, F.S., Report on Exploration of North-West Kimberley, 1901, Perth 1902 Extract from Appendix C by F. M. House, p. 18.

[35] *Vide* Allgem. Fischerei Ztg. 35, 353-6, 373, 4; Chem. Abstracts, vol. vi., 1912, p. 903

[36] Seed-pods of an *Acacia* were forwarded by G. F. Hill from Darwin, N.T. (probably *A. holocarpa*). The material possessed slight hæmolytic power, and proved slowly fatal to fish in somewhat increased concentration.

## Order MYRTACEÆ.

**EUCALYPTUS MICROTHECA**, F. v. M.

"JINBUL or KURLEAH," Cloncurry, N.Q.

"COOLIBAR," Normanton, N.Q.

A specimen has been submitted by Dr. C. Taylor, Normanton, with the following note:—"Coolibar branches and leaves are cut up small and left in water several days until totally discoloured and fish sicken; universally used."

As indicated by the donor's note and by our test experiments the plant is slow-acting but efficacious—death finally ensuing—at considerable concentration. The use of *E. microtheca* or other *Eucalypti* is the subject of mention by Sir Thomas Mitchell,[37] Palmer,[38] and Walter Roth.[39] Palmer, speaking of the blacks of the interior of Queensland, says "the small branches of *E. microtheca,* the Coolibah or Flooded Box, are cut up and with the leaves are laid in water for several days to sicken fish; it is universally used for this purpose." Roth refers to the use in the Cloncurry, Woonamurra, and Leichhardt-Selwyn districts, where he says "numerous leafy boughs and branches of 'gum-tree' are utilised for capturing fish."[40] The whole camp of blacks, working at it, will start throwing these in first thing in the morning; during the day the water becomes darker and darker, and strongly smelling, until by the following morning at sunrise, when it is almost black, the fish all lie panting on the surface and are easily caught.

The notes infer the slow nature of the effects and the use in considerable quantities. The effect, indeed, is compatible with low content of tannin, of which our specimen was found to contain in the bark 6 per cent. It is probable that species of *Eucalyptus* were indiscriminately used.

## Order MYRTACEÆ.

**BARRINGTONIA SPECIOSA**, Linn.

"ARROO," Townsville District, N.Q.

The toxic properties would seem to be from recorded use of various parts dispersed throughout the whole plant, including the seed capsules. The Queensland natives use the bark and leaves, adopting similar methods to those described by Roth for *Barringtonia racemosa.* In the districts in and around Townsville the native name of the plant is "Arroo." Here the fruit is eaten as food, and it is not a little strange that this should be so, in the face of the fact that the fruit of this very species is used for fish-poisoning in New Britain, as recorded by Dr. George Brown.[41] Further, the islanders of the Bismarck Archipelago poison by means of the seeds of *B. speciosa*, which are ground and thrown into the water, the fish snapping at the fragments and becoming stupefied.[42]

The inhabitants of the Mary Ann Islands use the same plant extensively,

[37] Thos. Mitchell, Expeditions to Australia, vol. ii., 1838, p. 24.

[38] E. Palmer, Notes on Some Australian Tribes, Journ. Anthrop. Institute, vol. 13, 1884, pp. 321, 2.

[39] W. E. Roth, N.Q. Ethnography, Bull. 3, 1901, para. 15, p. 19.

[40] W. E. Roth, Ethnol. Studies among N.W.C.Q. Aborigines, 1897, chap. v., The Search for Food.

[41] George Brown, Melanesians & Polynesians, 1910, p.

[42] Biro Lajos, Anz. Ethno. Abth. Ungarischen Nat. Museums, 1905.

and Alvin Seale[43] tells us " that in former times the natives caught and dried great quantities of fish by its means, a grand fishing fiesta being held at certain seasons of the year. The Spanish authorities, however, finding that this was depleting the waters by killing young as well as old, abolished the method in 1894. When the Americans took possession the law was considered obsolete. By chance I was present at the first of these fiestas that had taken place for seven years. Fully several hundred people took part in the fishing. An immense deep pool several hundred feet deep, a short distance inside the reef, was surrounded by a line of seines. At low tide about one barrel of this precious juice was poured into the pool. The effect was almost instantaneous; hundreds of fishes came gasping and struggling to the top of the water, where they were captured and killed by the natives. No ill-effects seemed to follow the eating of these poisoned fish."

Parkinson[44] records that in the island of St. Matthias the fruits of a *Barringtonia* species are used as floats for their nets, and although fish-poisons are known and used by the Gazelle Peninsula natives it has apparently not occurred to them to put the fruit to the same use as elsewhere. Fijians use the outer bark of the fruit for a similar purpose, so Seemann[45] tells us.

In our hands infusions of the bark proved effective and fairly rapidly acting. Initial extreme excitement with exaggerated movement of the gills appear predominant symptoms. The bark is alkaloid, saponin, practically tannin-free, and successive ether and alcohol extractions yielded innocuous infusions. The aqueous infusion of material, after exhaustion by ether and alcohol, proved readily toxic, but the nature of the active principle has not been ascertained.

**CAREYA AUSTRALIS**, F.v.M.

" MUSSIL" (MUSSAL), Cardwell District, N.Q.

" RAROO," Dunk Island.

" BARKABAH," Burdekin River, Q.

This well-known and effective fish-poison grows plentifully in forest country and along the foreshore of the Cardwell district, being known in the vernacular of the white man as " Coeky Apple" (*S. Creedy*) and as " Cockatoo Apple" at the Proserpine (*Sergt. Geary*). Its use is general in either fresh or salt water, but at Cardwell was resorted to when *Cupania* or *Derris* were unavailable. James Murrell mentions a differentiation on the Burdekin between the bark of the stem and bark of root for use in fresh or salt water. On Dunk Island, the bark at the base of the trunk and of the roots was macerated in the water in which fish were observed by being beaten with a nulla-nulla, the mass being thrown into the pool. Here also, on the authority of E. J. Banfield, the leaves were accredited medicinal virtue, being beaten and applied as fomentations.

The bark is saponaceous. Infusions show characteristic frothing at great dilutions, and hæmolyse at concentration 1 : 1,000. A separated sapotoxin fraction gave characteristic cherry-red colouration with concentrated sulphuric acid, but was devoid of hæmolytic power.

[43] Alvin Seale, Report of a Mission to Guam, Caroline Island ; Occasional Papers, B.P.B. Museum, Honolulu, pt. ii., 1901, p. 61.

[44] Parkinson, R., Dreissig Jahre in der Südsee (1907), p. 326.

[45] Seemann, D., Flora Vitiensis 1865 (1873).

## Order RUBIACEÆ.

**SARCOCEPHALUS CORDATUS**, Miq.

"OOLPANJE," Mitchell River, N.Q.

"COOLIABY," Cloncurry, Q.

As a food used by the natives of the Mitchell and Flinders Rivers, Palmer[46] mentions the fruit of *S. leichhardtii*, which is eaten raw. The bark of *S. cordatus* has been sent us from the Proserpine with a reputation as a fish-poison. *S. cordatus* appears to exert a slight and temporary stupefacient effect only in considerable concentration. The bark is pronouncedly bitter and contains a non-alkaloidal bitter principle or resin (*Bancroft*), and an alkaloid in very small quantity. Tannin is absent. *S. esculentus* has been stated to contain alkaloids (*see* Bull. Imp. Institute, vol. xiii., No. 1, p. 46), and Greshoff (loc. cit.) lists genus *Sarcocephalus* as being alkaloid-containing.

## Order EBENACEÆ.

**DIOSPYROS HEBECARPA**, A. Cunn.

"TULICAN," Goongangee Tribe, Cape Grafton.

"KUB," Torres Strait (*A. C. Haddon*).

Other species of *Diospyros* are toxic and the secretion of the fruit vesicatory. The use of the fruit is reported elsewhere as a fish-poison.[47] Relative to the properties and uses of the fruit of *D. hebecarpa* we are informed by Mr. Samuel Lyon, of Yarrabah, as follows:—"This large wide-spreading tree blossoms usually in September and October in North Queensland, and produces fruit which in its fresh condition has distinct toxic properties."

Members of the Goongangee tribe pound it between two flat stones, the resulting pulp being then placed in a dilly-bag, which is swirled about in the selected creek (fresh or salt water). In fresh water "Tulican" turns the water yellow, in salt water red. As the fish become stupefied they rise to the surface and are usually removed with a spear. In spite of the caustic nature of the fruit the poisoning does not in any way appear to spoil the fish as an article of food. The juice of the fruit brought into contact with the skin produces blistering, and the natives in handling it exercise great care in consequence. The specimen of dried fruit received was devoid of vesicatory power and inefficacious as a fish-poison, which, indeed, was not expected, from the emphasis laid by our correspondent upon the necessity of fresh condition.

## Order VERBENACEÆ.

**FARADAYA SPLENDIDA**, F. v. M.

"KOIE-YAN." Dunk Island.

In forwarding the specimen, E. J. Banfield writes: "Portions of the vine (*sic*) are cut into foot lengths; the outer layer of the bark is removed and rejected, the middle layer alone being preserved. This is carefully scraped off and made up in shapely little piles on fresh green leaves. When a sufficiency is

[46] E. Palmer, Journ. Anthropological Institute, vol. 13, 1884, p. 317.

[47] W. E. Roth, N.Q. Ethnography, Bull. 3, p. 19.

A. C. Haddon, Expedition to Torres Strait, vol. 4, p. 159.

obtained it is rubbed on to stones previously heated by fire. The stones being then thrown into a creek or a little lagoon left by the receding tide, the poison becomes disseminated, with fatal results to all fish and other marine animals."

Approached as to his opinion as to whether the use of specific portions of the plant was arrived at by accident or coincidence, "The Beachcomber," whose numerous contributions to Queensland Ethnology are of the greatest possible value, and who speaks from first-hand knowledge, states:—"I am fairly certain, from the mental qualities of the race, that most of its discoveries were accidental, though in the case of 'Koie-Yan' there must have been investigation. I am of the opinion that the crescent of the fish-hooks was evolved from the way in which a certain oyster-shell weathers on the beach, and that indeed Nature showed the several stages of the process of making, for I have found models of them all. Do not the inventions of the moderns prove the theory of evolution? With few exceptions each embraces gradual improvements on the original germ. In the case of most of the poisons it seems to me safe to believe that they result from the happy chance."

Dilute infusions of *F. splendida* are potent and rapidly acting. Agitation, subsequent stupefaction with approach to the surface, rapidly set in, and death supervened in as short a period as one hour. The active principle is saponin. Aqueous extracts show the characteristic foaming properties of saponin at extreme dilutions, and hæmolysis of blood corpuscles at final dilution of 1 : 4,000.

## Order ASCLEPIADEÆ.

### ASCLEPIAS CURASSAVICA, Linn.

This plant, a native of the West Indies, is stated to have made its appearance in Queensland somewhere about thirty years ago, and its adoption as a fish-poison on the Don River (*Sergt. Donohue*) is consequently comparatively recent.

The infused dry specimens obtained by us had no marked physiological action in considerable concentration, except an apparent slightly stupefying effect. Trout gudgeon were observed to continually approach the surface. The use of the plant as a love-charm by Pennefather River district—the men being reputed to rub themselves with it in order to compel a return of regard—is of much interest.

## Order POLYGONACEÆ.

### POLYGONUM HYDROPIPER, Linn.

"BOORAGOOLAH," Lower Flinders River, N.Q.

"TANGGUL," Pine River, Q.

T. Petrie[48] recalls the use of *P. hydropiper* as a fish-poison by the Pine River natives, and says that the plant was pounded up with sticks and then thrown into water, and the water stirred up with the feet. The use of *Polygonum* sp. in this capacity is widespread, and is noted by Greshoff on various authority.

[48] C. C. Petrie, Tom Petrie's Reminiscences of Early Queensland, dating from 1837, Brisbane, 1904, p. 73.